

Project Profile

Making better products by model-based testing on an industrial scale

D-MINT is developing model-based testing techniques for complex systems to make testing more efficient. These testing techniques combine various system aspects and their corresponding models, based on the architectural model. Such architecture-driven, model-based testing will allow the development of high-quality complex systems. Both European tool providers and systems developers will benefit from the results of this project.

complexity of systems is increasing and, at the same time, there is pressure to shorten development times.

To remain competitive, industrial software development has to consider early and continuously the assurance of system reliability and quality. Model-based approaches help not only in an effective quality assurance, but also in the evaluation and control of the coverage, costs and risks related to testing. Both the effectiveness and the efficiency of testing can be improved by model-based approaches.

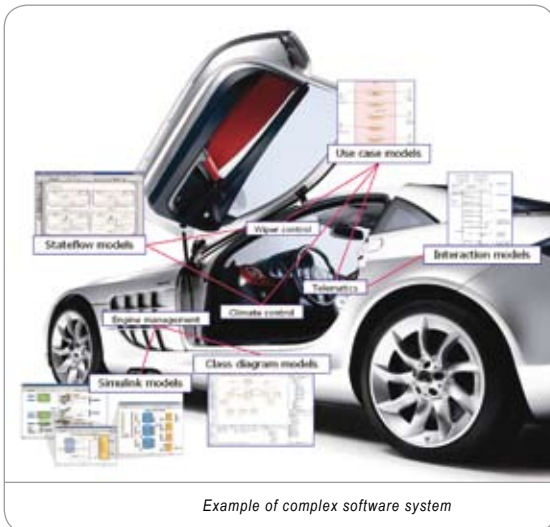
OVERCOMING LIMITATIONS

Model-based testing refers to software testing where test cases are derived in whole or in part from a model. The models describe aspects of the system such as structural, functional or non-functional features. Current model-based test approaches have two major problems: a lack of industrial scale and a limitation to homogeneous systems.

D-MINT combines the various systems aspects during test development, considering a combination of various potentially heterogeneous system models. D-MINT leverages model-based testing onto a higher level of abstraction: from model-based testing of single system models to model-based testing of integrated system models.

COMBINATION OF MODELS

The various systems models have to be integrated for a real industrial solution.



Software-intensive systems are becoming more and more part of our lives in technical, financial and social domains. The requirements on the functionality of such systems are increasing, as are the demands on their quality and reliability. As a result of these increased requirements, the overall



Some of the application areas within the D-MINT Project

D-MINT (ITEA 2 ~ 06014)

Partners

ABB
Abo Akademi
ALSTOM Transport
Conformiq Software
CWI
DaimlerChrysler
DATAPIXEL
ETSI
Fraunhofer FOKUS
Fraunhofer IESE
IDEKO
Improve Quality Service
Innovalia Association
INSPIRE
iXtronics
LaQuSo
LogicaCMG
Movares
Nethawk
Nokia Siemens Networks
PikeTec
ProRail
SQS
SORALUCE
Testing Technologies
Trimek
VTT Technical Research Centre of Finland

Countries involved

Finland
France
Germany
The Netherlands
Spain

Project start

April 2007

Project end

December 2009

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Project Profile

D-MINT will investigate the combination of models in the following five areas:

1. **ARCHITECTURE-DRIVEN TESTING:** The system architecture serves as an integrator of heterogeneous models. Test patterns serve as a guide for test generation capturing industrial expertise.
2. **MODEL-BASED INTEGRATED SYSTEM AND TEST DEVELOPMENT:** Requirements and test cases are managed and developed in a consistent way for distributed and compositional systems.
3. **TEST-CASE REFINEMENT:** Test case refinement is automatically synchronised with the actual system models.
4. **AUTOMATED CONSISTENCY CHECKS:** Requirements, models, and test cases are checked for consistency on both a syntactic and semantic basis.
5. **STATISTICALLY-CONTROLLED TEST PROCESSES:** Statistical methods use the models to measure, control and optimise process and systems qualities.

EMPIRICALLY VALIDATED

D-MINT will carry out its work using industrial case studies. Initially, requirements on methodologies and tools will be derived from industrial case studies. While developing or improving

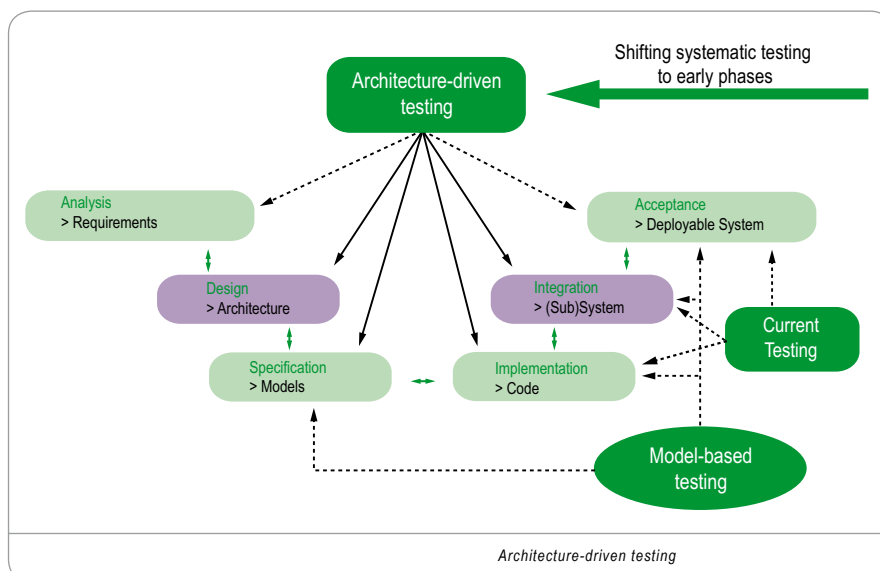
methodologies and tools, demonstration systems will be developed to showcase potential results. The methodologies and tools will be evaluated twice within the industrial case studies.

The case studies will also be used to validate the results obtained, which can be illustrated using the demonstration systems.

HIGH-QUALITY SYSTEMS

The results of D-MINT will allow the European software industry to develop high-quality systems using:

- **PACKAGED MODEL-BASED TESTING PROCESSES:** The packages include methods, techniques and experience reports to enable comparable developments beyond the specific ones chosen in the D MINT project;
- **TOOL CHAINS:** The tools will comprise test generation, test refinement, distributed test process control and test quality analysis;
- **CASE STUDY EXPERIENCES AND EVALUATIONS:** The results will be valid for industrial practice; and
- **SCALABLE TECHNIQUES:** New algorithms for test generation on an industrial scale will be available. An extended set of test patterns can be used for software-intensive systems in various domains.



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■ ITEA 2 – Information Technology for European Advancement – is Europe's premier co-operative R&D programme driving pre-competitive research on embedded and distributed software-intensive systems and services. As a EUREKA strategic Cluster, we support co-ordinated national funding submissions and provide the link between those who provide finance, technology and software engineering. Our aim is to mobilise a total of 20,000 person-years over the full eight-year period of our programme from 2006 to 2013.

■ ITEA 2-labelled projects are industry-driven initiatives building vital middleware and preparing standards to lay the foundations for the next generation of products, systems, appliances and services. Our programme results in real product innovation that boosts European competitiveness in a wide range of industries. Specifically, we play a key role in crucial application domains where software dominates, such as aerospace, automotive, consumer electronics, healthcare/medical systems and telecommunications.

■ ITEA 2 projects involve complementary R&D from at least two companies in two countries. We issue annual Calls for Projects, evaluate projects and help bring research partners together. Our projects are open to partners from large industrial companies and small and medium-sized enterprises (SMEs) as well as public research institutes and universities.



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